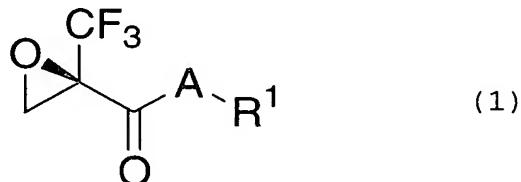


WHAT IS CLAIMED IS:

1. An optically active fluorine-containing compound represented by the following formula (1):



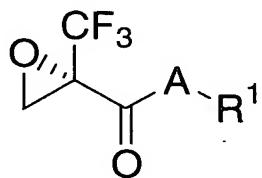
5 wherein A is an oxygen atom, a sulfur atom or an NH group, and R¹ is a methyl group, an ethyl group, a C₃₋₁₀ linear, branched or cyclic alkyl group, a C₆₋₂₀ aromatic group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by a halogen atom, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by a methyl group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by an ethyl group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by a C₃₋₆ linear, branched or cyclic alkyl group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by a methoxy group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by an ethoxy group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by a C₃₋₆ linear, branched or cyclic alkyloxy group, a C₅₋₁₉ heteroaromatic group, a C₅₋₁₉ heteroaromatic group having hydrogen on the aromatic ring optionally substituted by a halogen atom, a C₅₋₁₉

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heteroaromatic group having hydrogen on the aromatic ring
optionally substituted by a methyl group, a C₅₋₁₉
heteroaromatic group having hydrogen on the aromatic ring
optionally substituted by an ethyl group, a C₅₋₁₉
5 heteroaromatic group having hydrogen on the aromatic ring
optionally substituted by a C₃₋₆ linear, branched or
cyclic alkyl group, a C₅₋₁₉ heteroaromatic group having
hydrogen on the aromatic ring optionally substituted by a
methoxy group, a C₅₋₁₉ heteroaromatic group having
10 hydrogen on the aromatic ring optionally substituted by
an ethoxy group, a C₅₋₁₉ heteroaromatic group having
hydrogen on the aromatic ring optionally substituted by a
C₃₋₆ linear, branched or cyclic alkyloxy group, a benzyl
group, a benzyl group having hydrogen on the aromatic
15 ring optionally substituted by a halogen atom, a benzyl
group having hydrogen on the aromatic ring optionally
substituted by a methyl group, a benzyl group having
hydrogen on the aromatic ring optionally substituted by
an ethyl group, a benzyl group having hydrogen on the
20 aromatic ring optionally substituted by a C₃₋₆ linear,
branched or cyclic alkyl group, a 2-phenylethyl group, or
a C₃₋₁₀ linear, branched or cyclic alkyl group having a
C₆₋₂₀ aromatic group bonded thereto, or by the following
formula (2):



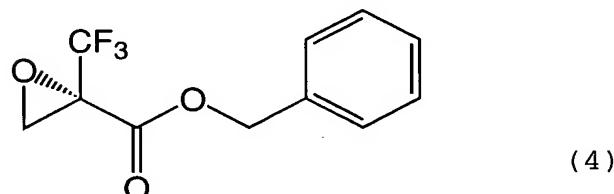
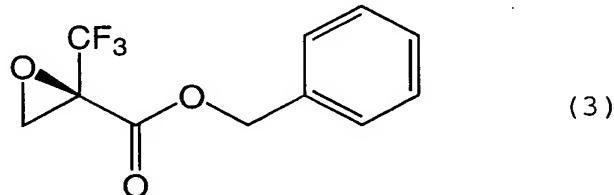
(2)

wherein A and R¹ are as defined above.

2. The optically active fluorine-containing compound according to Claim 1, wherein in the formula (1) or (2), A is an oxygen atom or NH group, and R¹ is a tert-butyl group, a phenyl group, a phenyl group having hydrogen on the aromatic ring substituted by a halogen atom, or a benzyl group.

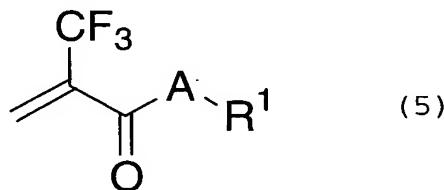
3. An optically active fluorine-containing compound represented by the following formula (3) or (4):

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4. A process for producing an optically active fluorine-containing compound as defined in Claim 1, which comprises asymmetrically epoxidizing an α,α,α -trifluoromethacrylic acid derivative represented by the following formula (5):



wherein A is an oxygen atom, a sulfur atom or an NH group,

and R¹ is a methyl group, an ethyl group, a C₃₋₁₀ linear, branched or cyclic alkyl group, a C₆₋₂₀ aromatic group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by a halogen atom, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by a methyl group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by an ethyl group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by a C₃₋₆ linear, branched or cyclic alkyl group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by a methoxy group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by an ethoxy group, a C₆₋₂₀ aromatic group having hydrogen on the aromatic ring optionally substituted by a C₃₋₆ linear, branched or cyclic alkyloxy group, a C₅₋₁₉ heteroaromatic group, a C₅₋₁₉ heteroaromatic group having hydrogen on the aromatic ring optionally substituted by a halogen atom, a C₅₋₁₉ heteroaromatic group having hydrogen on the aromatic ring optionally substituted by a methyl group, a C₅₋₁₉ heteroaromatic group having hydrogen on the aromatic ring optionally substituted by an ethyl group, a C₅₋₁₉ heteroaromatic group having hydrogen on the aromatic ring optionally substituted by a C₃₋₆ linear, branched or cyclic alkyl group, a C₅₋₁₉ heteroaromatic group having hydrogen on the aromatic ring optionally substituted by a

methoxy group, a C₅₋₁₉ heteroaromatic group having hydrogen on the aromatic ring optionally substituted by an ethoxy group, a C₅₋₁₉ heteroaromatic group having hydrogen on the aromatic ring optionally substituted by a 5 C₃₋₆ linear, branched or cyclic alkyloxy group, a benzyl group, a benzyl group having hydrogen on the aromatic ring optionally substituted by a halogen atom, a benzyl group having hydrogen on the aromatic ring optionally substituted by a methyl group, a benzyl group having 10 hydrogen on the aromatic ring optionally substituted by an ethyl group, a benzyl group having hydrogen on the aromatic ring optionally substituted by a C₃₋₆ linear, branched or cyclic alkyl group, a 2-phenylethyl group, or a C₃₋₁₀ linear, branched or cyclic alkyl group having a 15 C₆₋₂₀ aromatic group bonded thereto.

5. The process for producing an optically active fluorine-containing compound according to Claim 4, wherein in the formula (5), A is an oxygen atom, and R¹ is a tert-butyl group, a phenyl group, a phenyl group 20 having hydrogen on the aromatic ring substituted by a halogen atom, or a benzyl group.

6. The process for producing an optically active fluorine-containing compound according to Claim 4, wherein in the formula (5), A is an oxygen atom, and R¹ 25 is a benzyl group.

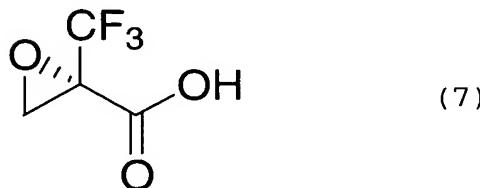
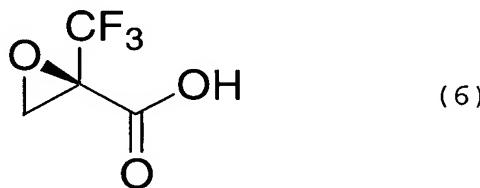
7. The process for producing an optically active fluorine-containing compound according to Claim 4,

wherein the α,α,α -trifluoromethacrylic acid derivative represented by the formula (5) is subjected to the asymmetric epoxidizing reaction in the presence of a catalyst comprising (A) a rare earth metal alkoxide, (B) 5 optically active 1,1'-bi-2-naphthol, (C) triphenylphosphine oxide and (D) cumene hydroperoxide or tert-butyl hydroperoxide.

8. The process for producing an optically active fluorine-containing compound according to Claim 7, 10 wherein (A) the rare earth metal alkoxide is a lanthanoid triisopropoxide.

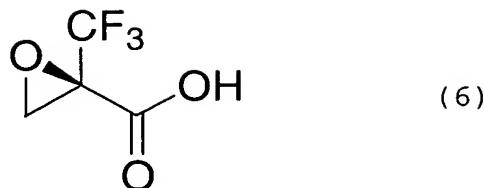
9. The process for producing an optically active fluorine-containing compound according to Claim 7, wherein (A) the rare earth metal alkoxide is lanthanum 15 triisopropoxide.

10. An optically active fluorine-containing compound represented by the following formula (6) or (7):



20 11. A process for producing the optically active fluorine-containing compound represented by the formula

(6) :

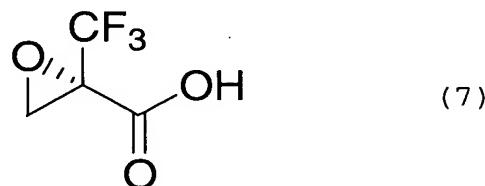


which comprises hydrolyzing the optically active
fluorine-containing compound represented by the formula

5 (1) in Claim 1.

12. A process for producing the optically active
fluorine-containing compound represented by the formula

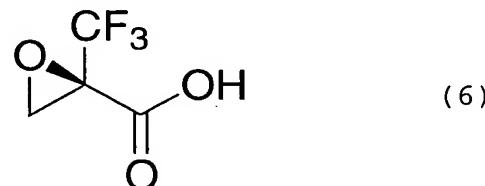
(7) :



10 which comprises hydrolyzing the optically active
fluorine-containing compound represented by the formula
(2) in Claim 1.

13. A process for producing the optically active
fluorine-containing compound represented by the formula

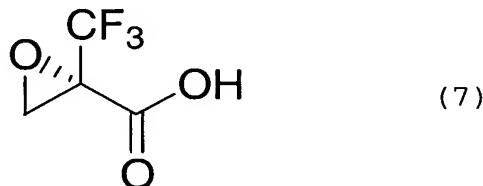
15 (6) :



which comprises hydrolyzing or hydrogenating the
optically active fluorine-containing compound represented

by the formula (3) in Claim 3.

14. A process for producing the optically active fluorine-containing compound represented by the formula (7):



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which comprises hydrolyzing or hydrogenating an optically active fluorine-containing compound represented by the formula (4) in Claim 3.

15. A process for producing (R)-3,3,3-trifluoro-2-hydroxy-2-methylpropionic acid, which comprises reacting the optically active fluorine-containing compound represented by the formula (6) in Claim 10, with a metal hydride.

16. A process for producing (S)-3,3,3-trifluoro-2-hydroxy-2-methylpropionic acid, which comprises reacting the optically active fluorine-containing compound represented by the formula (7) in Claim 10, with a metal hydride.